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Michigan State University

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1933 dairy costs and
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Place:

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Date:

1934

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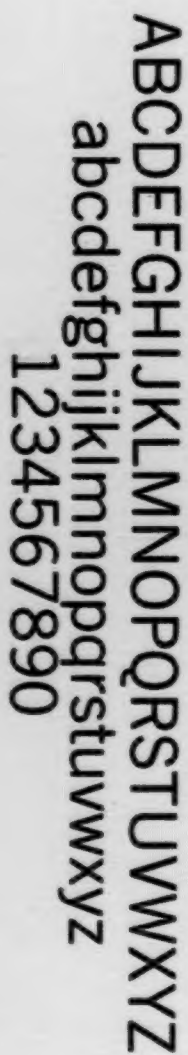
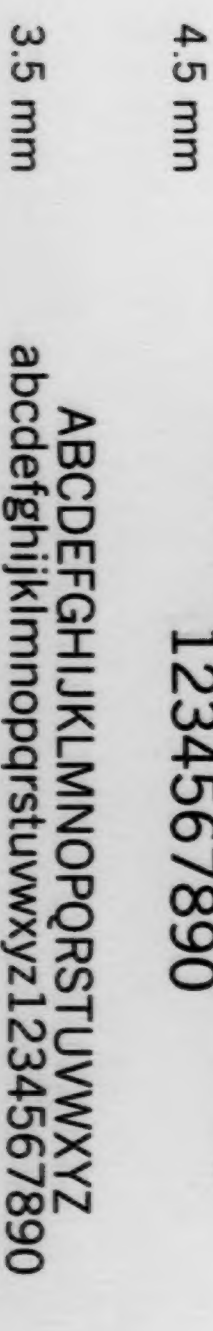
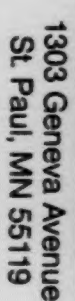
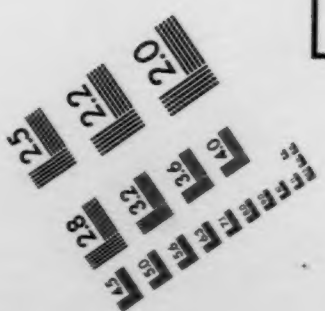
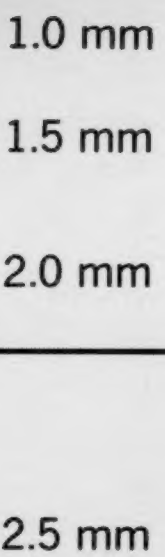
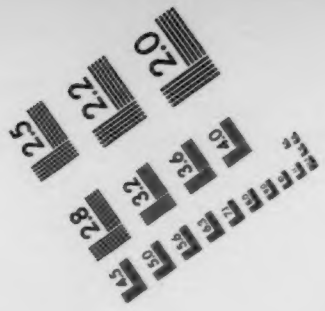
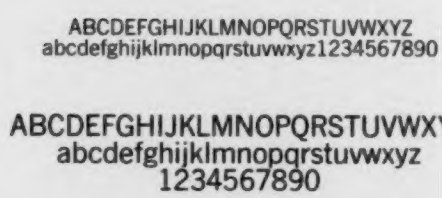
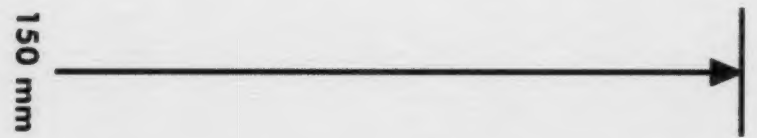
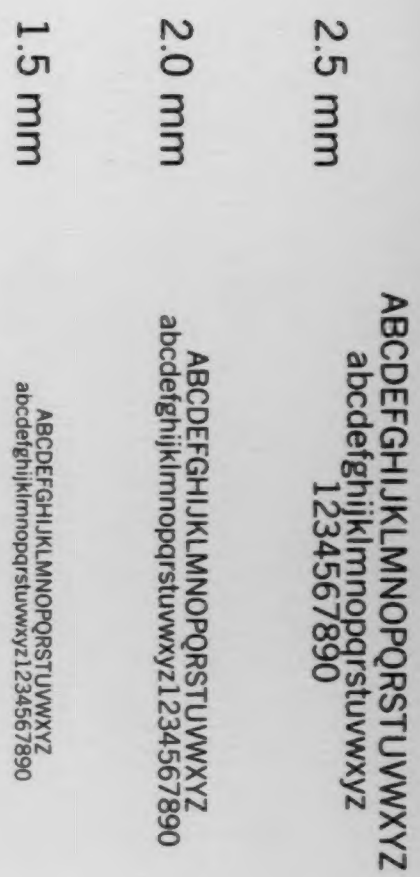
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—
1933 Dairy Costs
and Returns
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1933 dairy costs and returns on 74 michigan farms



Farm Management and Dairy Departments

Cooperating

MICHIGAN STATE COLLEGE
of Agriculture and Applied Science
Agricultural Experiment Station
East Lansing, Michigan

July - 1934

M - 123

Business

Contributors

K. T. Wright, P. F. Aylesworth and E. B. Hill of the Farm Management Department, who collected and summarized the records, analyzed the data, and wrote this report.

E. L. Anthony and A. C. Baltzer of the Dairy Department, who gave many constructive suggestions in the writing of this report, and rendered assistance to the cow testers in this study.

Cow testers who transferred the data from the D. H. I. A. Herd Record Books to the Dairy Cost Records and gave the farmers assistance in keeping other records essential to the analysis of the dairy enterprise.

Cooperating Dairy Herd Improvement Association Herd members who had much essential information in their records, and who assisted by keeping records of other data that were needed.

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DAIRY COSTS AND RETURNS IN MICHIGAN - 1933

This report presents the results of the second year of the dairy farm management study conducted in this State. This project is being carried on for the following purposes: (1) to determine the physical and financial requirements of dairy cows, and the milk and butterfat they produce, (2) to study the relation of methods and practices followed to costs and returns, (3) to compare costs and returns for various areas within the State, and (4) to show each cooperating dairyman how his costs, returns and methods compare with the average.

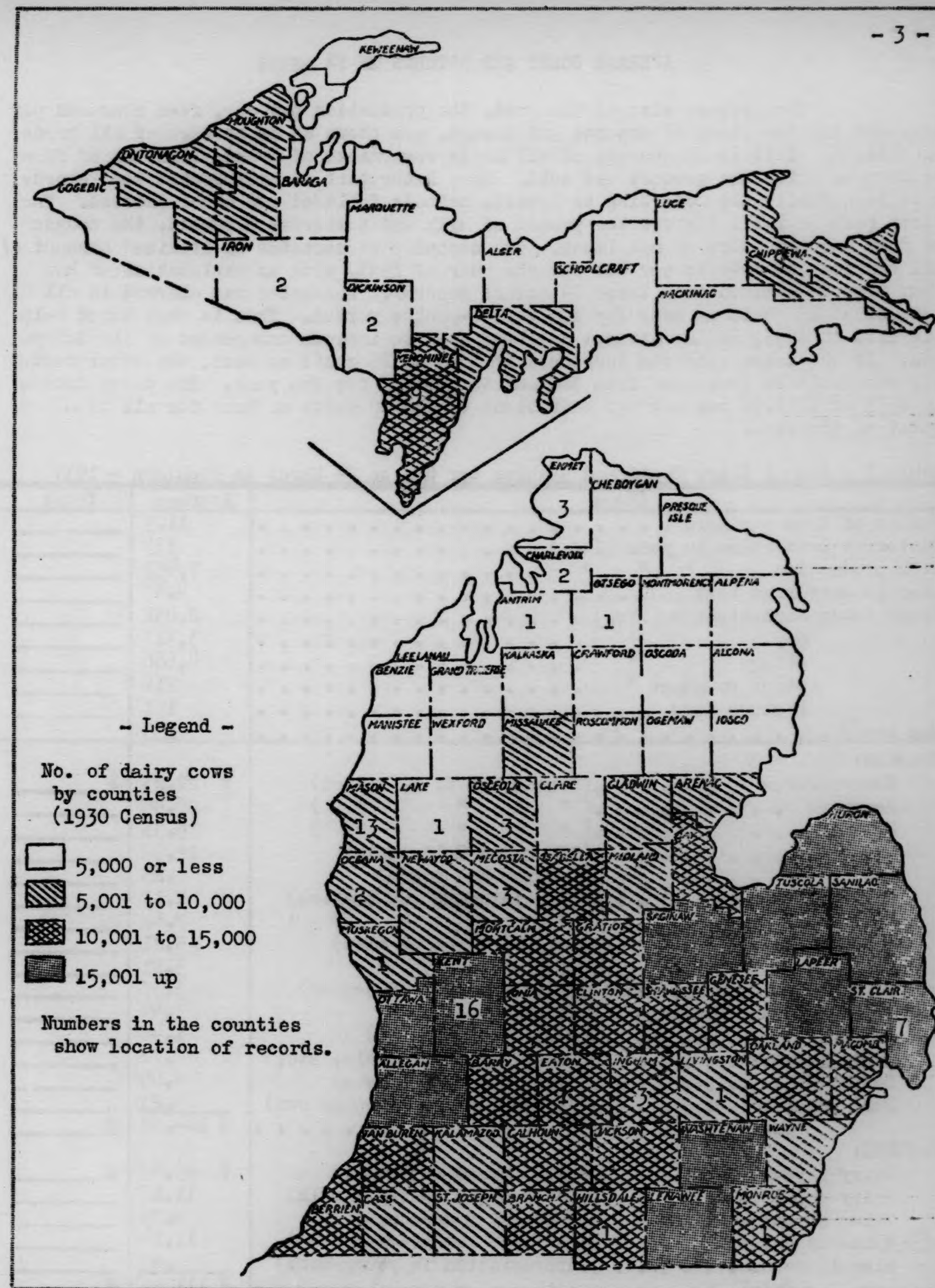
Dairy Cost Records were completed on 74 herds in Dairy Herd Improvement Associations. In general, the twelve-months period covered by the cost record was the same as the testing-year, most of which started between January and April, 1933, although a few started their year before or after those months. Some of the herds were all purebred, many were part purebred and part grade, and some were entirely grade stock. Herds that were of Guernsey breeding numbered 24, Jersey 22, Holstein 18, and of mixed breeds or breeding 10.

These 74 herds on which cost records were kept, were scattered widely, some being in the Upper Peninsula and others in various parts of the Lower Peninsula. This difference in location has certain influences upon methods, costs and returns, so the records were grouped into four general areas, (see map on page 3). The 14 records in the Upper Peninsula were considered as representative of that area, the 7 records from northern Michigan were another group, the 39 records in Kent and the other counties near by were called the west-central area, and the 14 scattered records remaining were called the south-central group.

Table 1 below, showing the average figures for the cooperating dairymen in each area, brings out some interesting differences. Some of these differences were probably the result of the particular dairymen keeping records, while others were due to location. Some of the main differences that were the result of location appear to be: (1) higher feed prices, especially on roughage in the Upper Peninsula and northern Michigan, (2) fairly high labor, buildings and equipment charges in these two areas, and (3) lowest average price for product in the Upper Peninsula and highest in the south-central area.

Table 1 - Dairy Costs and Returns by Areas in Michigan - 1933

Area	Upper Peninsula	Northern	West-central	South-central
Number of herds	14	7	39	14
Number of cows per herd	10.5	14.8	11.1	14.0
Butterfat production per cow(lbs)	312	319	354	310
Milk " " " " " "	7,792	6,834	7,580	7,269
Total cost per cow for year . .	\$113.27	\$107.80	\$104.78	\$ 97.29
" income " " " " " "	\$ 99.13	\$108.55	\$119.02	\$107.89
Charges per lb. B.F.:				
Feed	15.4¢	16.5¢	13.6¢	14.5¢
Labor	8.5	7.4	6.0	7.4
Bldgs. & equipment	3.6	3.3	2.5	3.2
Depreciation	3.1	1.4	1.8	.7
All other	5.7	5.2	5.7	5.6
Total	36.3¢	33.8¢	29.6¢	31.4¢
Credits per lb. B.F.:				
Milk, cream or butter . .	27.2¢	29.7¢	29.0¢	29.9¢
All other	4.6	4.3	4.6	5.0
Total	31.8¢	34.0¢	33.6¢	34.9¢
Av. concentrate cost per cwt. .	\$ 1.07	\$ 1.56	\$ 1.11	\$ 1.15
Av. roughage cost per ton . .	\$ 6.72	\$ 5.61	\$ 4.63	\$ 4.37



Dairy cow population and location of cooperators

AVERAGE COSTS AND RETURNS ON 74 HERDS

The average size of the herd, the production per cow, feed consumed per cow, and all the items of expense and income, are shown as an average of all herds in Table 2. This is an average of all herds regardless of breed, location of farm or farm in which the product was sold. In a later part of this report the records have been subdivided according to breeds, methods followed and other factors. The first part of Table 2 gives the pounds of milk and butterfat produced, the pounds of feed and the hours of man labor. The second part contains an itemized account of all charges and credits per cow for the year of 1933, with an explanation of how they were determined from these 74 actual records. Man labor was charged in all records at 15 cents an hour for the twelve-months period. This is what hired help was paid in 1933, and no attempt has been made to include management of the dairyman. If the labor rate was increased from 15 to 25 cents an hour, the total cost per cow would be increased from \$104.88 to \$120.18 for the year. The dairy income in 1933 of \$111.99 per cow was sufficient to pay 20 cents an hour for all time spent on the cows.

Table 2 - Annual Dairy Costs and Returns per Cow on 74 Herds in Michigan - 1933

Items	Average	Yours
Number of cows per herd	11.9	
Butterfat production in year (lbs.)	333	
Milk production " "	7,457	
Average butterfat test (%)	4.47	
Feeds Used: Concentrates (lbs.)	2,031	
Hay "	3,317	
Silage "	4,660	
Other roughage "	216	
Pasture days	151	
Man hours	153	
CHARGES:		
Concentrates (From D. H. I. A. record)	\$ 22.23	\$
Roughage (" " ")	20.45	
Pasture (" " ")	5.33	
Man labor (153 hours @ 15 cents)	22.92	
Use of auto (5 miles @ 5 cents)	.25	
Use of equipment (Dep. interest and repairs)	2.11	
Use of buildings (" " " ")	7.68	
Depreciation of cow (Loss in value of cows)	5.81	
Interest on cow value (At 6 per cent)	3.81	
D. H. I. A. dues and board (Dues and board of tester)	3.37	
Veterinary and medicine (Cash expense)	.44	
Bedding (Value of that used)	1.48	
Miscellaneous (Spray, salt, minerals, etc.)	.72	
Overhead (5% of all other costs)	5.05	
Bull expense (Fees or cost of keeping own)	3.23	
Total	\$ 104.88	\$
CREDITS:		
Dairy products sold (Milk, cream or butter)	\$ 85.47	\$
Dairy products used (Above items and skim milk)	11.13	
Value of calves (Value at 5 days age)	3.75	
Value of manure (At \$1.00 per average load)	11.14	
Miscellaneous (Appreciation in young cows)	.50	
Total	\$ 111.99	\$
PROFIT OR LOSS	\$ 7.11	\$
Labor Return	\$ 30.03	\$
Labor return per hour . . . . .	.20	

Figure 1 - Dairy Costs in Michigan for 1933 (Average of 74 farms)

Items	Cost per cow	Per cent of total cost								
		5	10	15	20	25	30	35	40	45
Feed	\$ 48.01					45.8				
Man labor	22.92		21.9							
Shelter and equip.	9.79	9.3								
Depreciation	5.81	5.5								
Interest on cow	3.81	3.6								
D. H. I. A.	3.37	3.2								
Bull expense	3.23	3.1								
All other costs	7.94	7.6								
Total	\$104.88									

Table 3 shows the amounts of feed used, the charges, and credits per hundred pounds of milk, and per pound butterfat. These have been computed on the yearly basis from the annual figures of Table 2. In 1933, these 74 dairymen whose herds had an average production of 333 pounds butterfat per cow, produced 100 pounds of milk testing 4.47 per cent at a cost of \$1.40 at their milk house. If the man labor is figured at 25 cents an hour, the milk would cost \$1.61 a hundred. The milk, cream or butter that was sold and used yielded an income of \$1.29 per 100 pounds of milk, and credits for calves and manure brought the total up to \$1.50 a hundred.

The average cost of a pound of butterfat produced by these high producing herds was 31.4 cents. The 1930 census shows the average annual butterfat production per cow in Michigan to be 194 pounds. A group of low-producing herds in this study averaged 210 pounds of butterfat per cow, and the butterfat cost 39.8 cents a pound. This is probably close to the average cost of all dairymen in the State in 1933.

Table 3 - Dairy Costs and Returns per cwt. Milk and per lb. Butterfat - 1933

Items	Per cwt. milk		Per lb. B. F.	
	Average	Yours	Average	Yours
Feeds Used: Concentrates (in pounds)	27.2		6.1	
Hay "	44.4		10.0	
Silage "	62.3		14.0	
Other roughage "	2.8		.6	
Pasture days	2.0		.5	
Man hours	2.0		.5	
CHARGES:				
Feed	\$ 0.64	\$	14.2¢	¢
Man labor . . . . .	.31		6.8	
Use of buildings and equipment . . . . .	.13		2.9	
Depreciation . . . . .	.08		1.7	
All other charges . . . . .	.24		5.8	
Total	\$ 1.40	\$	31.4¢	¢
CREDITS:				
Milk, cream or butter	\$ 1.29	\$	29.1¢	¢
All other credits . . . . .	.21		4.5	
Total	\$ 1.50	\$	33.6¢	¢
PROFIT OR LOSS	\$.10	\$	2.2¢	¢

Form of Product Sold - Of the entire group, 40 dairymen sold milk, 20 sold cream, and 14 sold their product in various forms. Six of this last group sold milk and cream, six sold milk, cream and butter, and two sold butter alone. Nineteen of the "milk men" lived in the west-central area, nine in the south-central, eight in the Upper Peninsula and four in the northern area. Sixteen of the "cream men" were located in the west-central area, two in the Upper Peninsula and two in the south-central area.

The form in which the dairy product is sold frequently has considerable influence upon methods used, costs and returns. Table 4 contains the average figures for the three groups described above, and is intended to bring out some of the differences due to the form in which the product is marketed. The costs and returns are presented on a butterfat basis rather than per 100 pounds of milk, to eliminate differences due to butterfat test. The feed cost for those selling cream was less than the other two groups, primarily because they lived in areas of lower feed prices. Other items of cost varied little between the three groups, so the total cost per pound of butterfat produced was practically the same throughout. The butterfat netted the dairymen nearly eight cents less per pound on the "cream farms" than on either of the other two groups of farms. This includes the credit for skim milk figured by the tester at an average price of 18 cents a hundred pounds. Under 1933 conditions the higher income on the "milk farms" even though the price of milk was low, made possible a small profit, while the cream group lost 2.8 cents per pound butterfat produced, due to low cream prices.

In regard to evenness of production throughout the year, the milk producers varied the least. They produced 27 per cent of the year's production in April, May and June and 23 per cent in October, November and December. Comparable figures for the men producing cream were 32 and 20 per cent, and for the miscellaneous group 28 and 23 per cent. The variation from the low-quarter production to the spring quarter was, therefore, 17 per cent, 59 per cent and 21 per cent, respectively.

Table 4 - Influence of Form in which Product was Sold on Dairy Costs & Returns-1933

Items	Milk	Cream	Misc.
Number of farms	40	20	14
Number of cows per herd	13.4	9.8	10.8
Butterfat production per cow (lbs.)	322	347	354
Milk " " " " "	7,398	7,307	7,859
Av. butterfat test (%)	4.4	4.8	4.5
Charges per lb. butterfat:			
Feed	14.9¢	12.8¢	14.7¢
Man labor	6.5	7.6	7.2
Use of buildings and equipment	2.9	3.0	3.0
Depreciation	1.8	1.7	1.5
All other charges	5.3	5.8	5.7
Total	31.4¢	30.9¢	32.1¢
Credits per lb. butterfat:			
Milk, cream or butter sold	28.4¢	17.9¢	26.6¢
Milk, cream, butter or skim milk used	2.3	5.2	4.3
All other credits	4.4	5.0	4.8
Total	35.1¢	28.1¢	35.7¢
Profit or loss per lb. butterfat	3.7¢	-2.8¢	3.6¢
Dairy product sales per cwt. milk	\$ 1.34	\$ 1.10	\$ 1.39
Total credits " " "	1.53	1.34	1.61
Total charges " " "	1.37	1.47	1.45
Profit or loss " " " . . . . .	.16	-.13	.16

Comparison of the Most and Least Efficient Herds - It would generally be supposed that most, if not all of the dairymen in Dairy Herd Improvement Associations keeping complete cost records, would be quite efficient producers of dairy products. This, on the whole is quite true, as proven by the average production of 333 pounds of butterfat per cow on these 74 farms. Nevertheless, there were wide variations in production per cow and costs even on these farms, as evidenced by a range in butterfat production per cow from 136 to 488 pounds; feed cost per pound butterfat ranging from 9 to 25 cents; and total cost per pound butterfat from 20 to 51 cents. These differences in cost when multiplied by the total pounds of butterfat produced per farm in the year (about 4,000 lbs. on these farms) make drastic variations in the farm income. Part of these differences may be due to factors beyond the control of the individual farmer, but the major portion is the result of differences in organization and management on the part of the dairyman.

In Table 5, the 15 herds producing butterfat at the lowest cost were averaged and compared with the 15 herds having the highest cost per pound butterfat. This comparison shows the high-cost herds to have: (1) about 30 per cent lower butterfat production per cow; (2) far more grade cows in the herds; (3) over 50 per cent higher feed cost per pound butterfat, approximately one-half of which was due to less efficient use of feed, and one-half to higher feed prices where these men lived; (4) over 75 per cent higher labor charge per pound butterfat, because a third more time was spent milking and caring for each cow during the year, even though they produced less; (5) higher charges on all the other cost items; (6) decidedly higher receipts per pound butterfat on account of better market; and (7) about \$30 lower net return per cow for the year even though the product sold for a much higher price per pound.

Table 5 - Comparison of Herds with Lowest and Highest Cost per lb. Butterfat - 1933

Items	Your herd	15 Low-cost herds (best)	15 High-cost herds
Number cows per herd	_____	11.7	11.5
Butterfat production per cow	_____	366	269
Milk " " " " "	_____	8,184	6,596
Total annual man hours per cow	_____	128	164
Feeds used per lb. butterfat:			
Concentrates (lbs.)	_____	5.6	7.0
Hay " " " " "	_____	9.3	11.5
Silage " " " " "	_____	12.7	24.0
Charges per lb. butterfat:			
Feed	_____	11.6¢	18.1¢
Man labor	_____	5.3	9.3
Bldgs. and equipment	_____	2.1	4.2
Depreciation	_____	.7	3.2
All other	_____	4.3	6.8
Total	_____	24.0¢	41.6¢
Total credits per lb. butterfat	_____	29.2	37.6
Profit or loss " " " " "	_____	5.2	4.0
Return per hour labor on cows	_____	30¢	9¢
Average butterfat test (%)*.	_____	4.4	4.1

*To obtain the pounds of feed fed and the charges or credits per 100 pounds of milk, multiply the above figures by the average butterfat test.

MAJOR FACTORS AFFECTING DAIRY COSTS AND RETURNS

Annual Production per Cow - In the foregoing table it was seen that production per cow is one of the important factors affecting cost per pound butterfat. In Table 6 the records have been sorted on the basis of production per cow in order to determine how influential it is on costs and returns. The lowest production group averaged 210 pounds of butterfat per cow, while the highest group averaged 441 pounds per cow. The annual feed cost per cow was \$35.59 in the low-production group and \$54.96 in the high-production group. Costs other than feed for the year for the low producers was \$48.23, while costs other than feed for the high-producers was \$63.35. Labor, buildings and equipment, interest and overhead accounted for most of the difference. The total income per cow was only \$78.20 for the low-production group, and \$145.11 for the high-production group. This shows the low-producers to have lost \$5.62 a cow, and the high-producers to have a profit of \$26.80 per cow for the year.

The butterfat produced by the low-producing cows cost their owners 39.8 cents a pound, if their labor is figured at 15 cents an hour. On the other hand, the butterfat produced by the high-producing cows cost their owners 26.8 cents a pound, if their labor is figured at the same rate. Obviously the labor, or really the management on these herds is worth varying amounts, but who can say how much should be charged for the management. Each dairyman received for his management, the difference between the total cost, figured as already described, and the total credits, or the profit per cow.

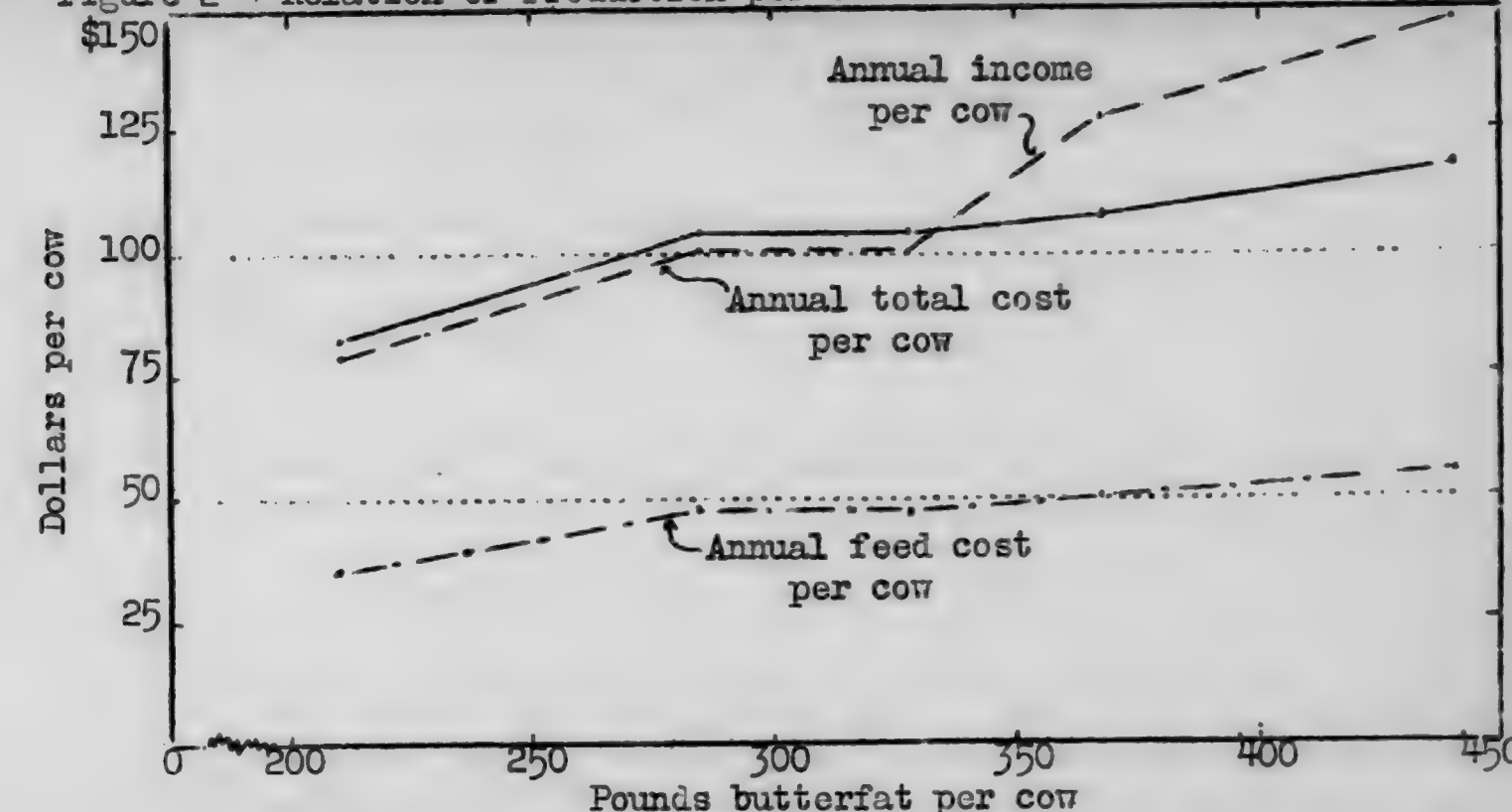
The lower butterfat cost on the high-producing herds can be attributed to: (1) better bred cows; (2) more efficient feeding methods; and (3) superior care and management of the herd.

Table 6 - Relation of Production per Cow to Costs and Returns - 1933

Pounds butterfat per cow	Over 400	399 - 350	349 - 300	299 - 250	249 down
Number herds	9	25	22	9	9
Number cows per herd . .	9.2	12.3	12.7	12.4	11.0
B. F. production per cow	441	368	327	282	210
Milk " " " "	8,887	8,221	7,300	6,353	5,576
CHARGES: (per cow)					
Feed	\$ 54.96	\$ 49.99	\$ 47.81	\$ 48.90	\$ 35.59
Man labor @ 15¢ . .	24.14	22.59	24.51	21.26	20.23
Bldgs. & equipment .	10.86	9.42	9.87	10.19	9.34
Depreciation	5.77	6.72	4.96	6.14	5.10
All other	22.57	20.09	16.94	18.26	13.56
Total	\$118.31	\$108.81	\$104.09	\$104.75	\$ 83.82
Total credits (per cow).	\$145.11	\$128.31	\$100.59	\$101.00	\$ 78.20
Profit or loss " " .	\$ 26.80	\$ 19.50	\$ -3.50	\$ -3.75	\$ -5.62
Return per hour labor .	31.6¢	27.9¢	12.8¢	12.3¢	10.8¢
Feed cost per lb. B.F. .	12.5¢	12.8¢	14.6¢	17.3¢	16.9¢
Total " " " " .	26.8¢	29.5¢	31.8¢	37.2¢	39.8¢
Water cows inside barn (%)	89	84	73	67	56
Feed grain on pasture "	100	80	86	78	22
Value per cow	\$ 84	\$ 74	\$ 56	\$ 53	\$ 48

Figure 2 on page 9 presents graphically some of the information contained in the preceding table. The total cost per cow was 41 per cent higher on the high-producing cows than the low-producing, and the income was 86 per cent higher. Under 1933 conditions, a herd had to average well over 300 pounds butterfat before there was any return for management under average conditions.

Figure 2 - Relation of Production per Cow to Costs and Returns - 1933 - 9 -



Feeding Efficiency - Feed cost constituted nearly 46 per cent of the total cost of producing dairy products on these farms. The 15 herds having the lowest feed cost per pound butterfat have been averaged and shown in Table 7 for comparison with the 15 herds having the highest feed cost. In some ways it would be better to compare these herds on the basis of pounds of feed used rather than feed cost, since it would eliminate the influence of price per pound of feed, due to location. Feed cost per pound butterfat, however, was used as the basis of sort, because of the difficulties involved in the "pounds basis" and because price of feed is an important influence in the cost of producing milk or cream.

This group of one-fifth the herds in the study having the lowest feed cost per pound butterfat were superior to the other one-fifth in several ways. Their butterfat production per cow was 18 per cent higher. The quantity of feeds used per pound butterfat were from 10 to 35 per cent less. More of the herds were on legume or mixed pastures, and received grain when on pasture, and much less money was spent for dairy feed. The average cost or value of the concentrates and roughages was much less on the low-cost herds largely because they were located in areas of lower feed prices. (See Table 1). The feed cost per pound butterfat was 10.9 cents on the low-cost group, and 18.4 cents on the high-cost group. About 58 per cent of this difference in cost appears to be the result of difference in cost appears to be the result of difference in feed prices, and 42 per cent to better feeding practices and more efficient cows.

Table 7 - Comparison of Feed Cost per pound Butterfat - 1933

Items	15 Low-cost herds	15 High-cost herds
Number cows per herd	9.1	15.4
Butterfat production per cow	363	307
Milk " " " "	7,761	7,152
Feed used per lb. butterfat		
Concentrates (lbs.)	5.9	6.4
Hay " " " "	8.1	11.3
Silage " " " "	12.3	18.8
Pasture days . . . . .	.5	.4
Concentrate cost per 100 lbs.	\$.91	\$ 1.33
Roughage cost per ton (av. all)	4.09	5.54
Herds on legume or mixed pasture (%)	60	40
Dairy feed bought per cow	\$ 10.12	\$ 30.61
Feed cost per lb. butterfat	10.9¢	18.4¢
Total " " " "	25.7	36.5

Size of Herd - The 74 herds in this study varied in size from 4 to 34 cows. This factor of size has considerable influence upon the efficient use of labor, buildings, equipment and other important items of cost. In Table 8 the farms have been grouped according to the average number of cows so that the factor of size could be studied. The small herds averaged 6.7 cows, the medium 10.7 and the large herds 18.3 cows. The annual butterfat production per cow was nearly the same in all groups, with the small herds averaging about 10 per cent higher.

The annual labor charge per cow was \$5.75 less on the large herds than the small, due to 27 per cent fewer hours in the year. The hours spent milking were 23 per cent less, feeding 23 per cent less and "other work" 40 per cent less. Five per cent of the small herds were milked by machine, while 48 per cent were so milked in the large herds. The equipment charge per cow was the same for all sizes, except for the charge for the use of the milker, which made the total higher on the large herds. The investment in dairy equipment averaged five dollars per cow exclusive of the milking machine. The investment in dairy barns averaged \$1,875 per farm or about \$158 per cow. On the small herds the barn investment averaged \$217 per cow. From these figures it can be seen that there are certain economies in a large herd, but the total cost per cow, divided by the pounds butterfat produced, shows the cost to be 31.1 cents a pound for the small herds, 31.0 cents for the medium size, and 32.0 cents for the large herds. After all, the best size herd for any one farm depends upon the organization of that farm from the standpoint of feed, labor, buildings and equipment available.

Table 8 - Influence of Size of Herd on Costs - 1933

Size-groups	Small	Medium	Large
Number cows	9.0 or less	9.1 to 13.0	13.1 or more
Number herds	22	29	23
Number cows in herd	6.7	10.7	18.3
Butterfat production per cow . . .	355	326	330
Milk " " "	7,862	6,909	7,717
Charges per cow:			
Feed	\$ 45.39	\$ 45.92	\$ 50.35
Man labor	27.66	22.01	21.91
Bldg. use	8.85	6.90	7.84
Equip. use	1.57	1.64	2.64
Depreciation	5.22	6.08	5.83
Bull expense	3.22	3.97	2.68
All other	18.60	14.39	14.57
Total	\$110.51	\$100.91	\$105.82
Profit or loss	\$ -2.79	\$ 6.48	\$ 11.06
Per cent using milking machines .	5	10	48
Hours labor per cow for year:	180	147	132
Milking	106	87	82
Feeding	34	29	26
Other work	40	31	24

Method of Milking - One of the small herds was milked with a milker, three of the medium size and eleven of the large herds. Data on equipment and labor costs per cow, comparing hand and machine milking on the medium and large herds is contained in Table 9. The three herds on which milkers were used in the medium sized group had distinctly higher labor and equipment costs than those hand milked. With herds of 16 cows or more there appeared to be quite an advantage with the use of a milking machine. The labor and equipment charge being \$23.26 for those hand milked and \$21.82 for those machine milked. In other words, the \$2.65 higher equipment charge for the milker saved 27 hours of labor per cow in the year.

Table 9 - Influence of Method of Milking on Costs - 1933

Size of herd	9.1 to 13 cows		13.1 cows and over	
	Hand	Machine	Hand	Machine
Number of herds	26	3	12	11
Number cows per herd	10.5	12.2	16.8	20.0
Butterfat production per cow . .	328	311	337	324
Equipment charge per cow . . .	\$ 1.10	\$ 5.62	\$ 1.26	\$ 3.91
Labor " " "	21.58	25.25	22.00	17.91
Total labor and equipment . .	\$ 22.68	\$ 30.87	\$ 23.26	\$ 21.82
Hours labor per cow per year:				
Milking	85	97	95	71
Feeding	29	27	26	26
Other work	30	44	25	22
Total	144	168	146	119

Milking Machine Costs - In this group of 74 farms, milking machines were used on 15 during 1933. The costs of operating these milkers is presented in Table 10. The total cost for the year was \$45.95 or \$2.60 per cow as an average, since these herds averaged 17.6 cows per farm. Average labor requirements per cow for all herds was 93 hours for milking, 30 hours for feeding and 30 hours for other work for a total of 153 hours.

Table 10 - Annual Costs of Operating Milking Machines - 1933 (Av. 15)

Average investment at beginning of year	\$ 181.00
Depreciation during year	12.60
Interest on investment	10.49
Repairs	5.63
Fuel or electricity	17.23
Total annual cost	\$ 45.95
" " " per cow (17.6)	\$ 2.60

Breeds - In 1933 Guernsey herds made up 35 per cent of the total, Jersey 27 per cent, Holstein 25 per cent and mixed herds 13 per cent, see Table 11. Quite a number of the Guernsey and Jersey herds were in the west-central area, and 40 per cent of the Holsteins in this group were in the Upper Peninsula. The dairy product was sold as cream from 36 per cent of the Jerseys, 29 per cent of the Guernseys and 11 per cent of the Holsteins. Milk was sold from one-half the Jerseys, 46 per cent of the Guernseys and 67 per cent of the Holsteins.

Table 11 - Comparison of Breeds - 1933

Breed	Jersey	Guernsey	Holstein	All others
Number herds	22	24	18	10
Number cows per herd	10.6	12.8	12.4	11.6
Butterfat production per cow . .	334	354	307	324
Milk " " "	6,542	7,332	8,509	7,617
Average butterfat test (%) . . .	5.10	4.83	3.61	4.24
" value per cow	\$ 62	\$ 78	\$ 53	\$ 49
" " of calf at 5 days	3.42	5.42	3.14	1.09
Per cent of cows pure bred . . .	51%	50%	38%	9%
Feed cost per cwt. milk	\$.71	\$.76	\$.50	\$.66
Total " " "	1.53	1.55	1.13	1.41
Feed cost per lb. butterfat . . .	13.8¢	15.7¢	13.9¢	15.5¢
Total " " "	30.0	32.0	31.4	33.1

Breeding of Herd - In this group of 74 herds there were 12 herds in which the cows were all purebreds, and 19 herds where the cows were all grades. The balance of the herds were varying proportions of grade and purebreds. All herds were sorted into one of two groups, those in which at least one-half the cows were pure-bred and those that were over one-half grade (see Table 12). This comparison shows the herds having more purebred cows to have higher depreciation, higher bull expense, and higher total expense per cow for the year. The value of the calves, however, was higher on this group, and the cows also produced more butterfat per cow. The total cost per pound butterfat was the same for both groups. In the herds where over one-half the cows were grade, the bull expense per cow was quite low, but even then the value of the calves at five days age was 84 cents a cow less than the bull charge. On the herds where a high percentage were purebred, however, the higher bull expense was balanced off by the calf value and there was \$2.88 to spare.

Table 12 - Influence of Breeding of Herd on Costs and Returns - 1933

Items	Over 1/2 of cows P. B.	Over 1/2 of cows grade
Number herds	29	45
Number cows per herd	11.1	12.4
Butterfat production (per cow)	357	319
Milk " " "	7,538	7,482
Total cost for year " "	\$ 113.21	\$ 101.08
" credits " " "	119.58	108.69
Depreciation " "	8.24	4.46
Bull expense " "	4.06	2.78
Value of calves " "	6.94	1.94
Butterfat cost per pound	31.7¢	31.7¢

Further study on depreciation charges shows that the herds having a high charge for this item, also had more cows sold on account of low production and less cows sold as milk cows, higher death loss, and more cows out due to disease. More cows and heifers had to be added to the herds having high depreciation. This discussion is not intended to discourage culling of the herd to improve the production per cow, but is intended to bring out the tendency of higher depreciation charges on herds that are more valuable, due to being purebred or high producing, and on herds in which any disease is present.

Annual Bull Costs - Fifty of the 74 dairymen cooperating in this study owned their own bull, and 10 owned a share in a bull. Six men had leased bulls, and the remaining eight paid other dairymen for bull service. In herds of 9 cows or less 68 per cent of the men owned a bull or an interest in a bull. In the herds averaging 18 cows 83 per cent owned a bull or an interest, and 4 per cent paid others for bull service. Table 13 shows the amount of feed, hours of labor and all costs incident to keeping a bull. These 56 records include 23 Guernsey bulls, 15 Jerseys, 13 Holsteins, and five others on which the breed was not indicated. The total cost amounted to \$61.98 for the year. The net cost, which has to be borne by the cows and the dairy products sold, amounted to \$45.65 per herd or \$3.65 per cow for herds averaging 12.5 cows. Herds smaller than this would naturally have a higher bull charge per cow, and larger herds smaller charges. Some of the owners of small and medium sized herds owned bulls in partnership so that the charge against their own herd would be less.

Table 13 - Annual Costs of Keeping a Dairy Bull - 1933 (Av. 56)

Feeds used in year:		
Concentrates (lbs.)	555	
Hay "	5,252	
Silage "	1,595	
Hours man labor on bull in year	88	
Annual charges per bull:		
Feed	\$ 28.93	
Man labor	13.16	
Use of buildings and equipment	7.71	
Depreciation	3.82	
Interest on value	5.75	
Bedding	2.61	
Total for year	\$ 61.98	
Annual credits per bull:		
Manure produced	\$ 11.49	
Fees received	2.34	
Appreciation	2.50	
Total for year	\$ 16.33	
Net annual bull cost	\$ 45.65	
Net bull cost per cow (12.5)	\$ 3.65	

Accumulative Effect of Efficient Methods - Several of the preceding tables have shown how various factors influenced costs and returns. Frequently a dairyman that was better than average in one factor was also better in others. With this in mind, the individual records were scored, based upon how many of the six factors that particular herd was better than average. The results of that tabulation are shown in Table 14. Five herds were better than average in all six factors. They averaged 389 pounds of butterfat per cow, produced at a cost of 24.4 cents a pound, and made a profit of \$20.00 a cow for the year. Twelve herds were better than average in not to exceed one point. These herds averaged 278 pounds of butterfat per cow, produced at a cost of 39.2 cents a pound, and had a loss of \$11.21 a cow for the year. This difference of \$31.21 between these two groups in the annual net return per cow, amounts to over \$370 per farm for herds of the size included in this study. This indicates that the individual dairyman can do to improve his own dairy returns by a well balanced dairy program even though he can do only little regarding the price of the product.

Table 14 - Accumulative Effect of Efficient Methods - 1933

Grade	1 or less	2	3	4	5	6
Number of herds	12	7	17	10	23	5
Number cows per herd	13.3	11.3	11.7	11.8	11.6	11.4
B. F. production per cow . .	278	302	316	339	374	389
Total cost " " . .	\$109.12	\$106.23	\$108.72	\$108.04	\$ 99.76	\$ 95.14
" credits " " . .	97.91	108.90	103.35	122.70	122.32	115.14
Profit or loss " " . .	-11.21	2.67	-5.27	14.66	22.56	20.00
Cost per lb. B. F.	39.2¢	35.2¢	34.4¢	31.8¢	26.7¢	24.4¢

The averages for the six factors used were: (1) 333 pounds or more butterfat per cow, (2) 14.2¢ or less feed cost per pound butterfat, (3) 6.8¢ or less labor charge, (4) 2.3¢ or less buildings charge, (5) 1.7¢ or less depreciation charge, and (6) .6¢ or less equipment charge per pound butterfat.

The dairymen grading 2 or less in Table 14 had been in Dairy Herd Improvement Associations an average of 2.7 years. Those with a grade of 5 or more, had been in testing associations an average of 5.4 years. Apparently the high-grading men have been striving to improve their dairy efficiency for a longer time.

DAIRY EFFICIENCY BAROMETER

No. cows in herd	B.F. prod. per cow	Costs and Returns per lb. B.F.							Labor return per hour
		Feed cost	Labor charge	Bldgs. & equip. charge	Depreciation charge	Total cost	Total credits	Profit	
34.3	488	8.5¢	3.1	.7	0	19.9¢	49.4¢	21.6¢	82¢
23.9	483	8.2	—	—	—	19.4	45.6	14.2	50
21.9	458	9.2	—	—	—	21.4	43.6	12.2	45
19.9	433	10.2	2.8	.9	—	23.4	41.6	10.2	40
17.9	408	11.2	3.8	1.4	.2	25.4	39.6	8.2	35
15.9	383	12.2	4.8	1.9	.7	27.4	37.6	6.2	30
13.9	358	13.2	5.8	2.4	1.2	29.4	35.6	4.2	25
11.9	333	14.2	6.8	2.9	1.7	31.4	33.6	2.2	20
9.9	308	15.2	7.8	3.4	2.2	33.4	31.6	.2	15
7.9	283	16.2	8.8	3.9	2.7	35.4	29.6	-1.8	10
5.9	258	17.2	9.8	4.4	3.2	37.4	27.6	-3.8	5
3.9	233	18.2	10.8	4.9	3.7	39.4	25.6	-5.8	0
—	208	19.2	11.8	5.4	4.2	41.4	23.6	-7.8	-5
—	183	20.2	12.8	5.9	4.7	43.4	21.6	-9.8	-10
4.4	136	24.6	18.5	9.3	7.7	51.3	22.7	-11.6	-10

Each column shows some important dairy factor. The averages for all herds appear at the middle, and the extremes at the top and bottom of the columns. The red mark shows how your herd ranks in each item.

Analysis of Your Results

Strong points:

Weak points:

Table 15 - Monthly Data on Production per Cow, Feed and Labor Requirements - 1933

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Number cows in herd	11.9	11.9	11.8	11.7	11.7	11.7	11.8	11.9	12.1	12.0	12.0	11.8
Milk prod. per cow (lbs.)	626	585	656	702	744	692	654	608	526	541	548	573
B.F. " " " "	27.8	26.1	29.0	30.4	33.1	33.0	31.3	26.8	23.8	24.8	26.7	27.9
Requirements per cow:												
Man labor (hours)	13.4	12.7	13.7	13.5	11.7	9.8	9.9	9.5	9.3	11.2	12.8	13.7
Concentrates (lbs.)	206	191	222	213	173	105	118	128	125	145	179	187
Hay " "	466	460	488	470	187	38	47	70	163	281	420	495
Silage " "	670	574	537	556	294	44	97	162	178	367	626	678
Pasture (days)	—	—	—	—	20	29	30	30	25	17	—	—
Requirements per lb. B.F.:												
Man labor (hours)	.48	.49	.47	.44	.35	.29	.31	.35	.39	.45	.48	.49
Concentrates (lbs.)	7.3	7.3	7.6	6.9	5.2	3.1	3.7	4.7	5.2	5.8	6.6	6.6
Hay " "	16.7	17.6	16.8	15.4	5.6	1.1	1.5	2.6	6.8	11.3	15.7	17.7
Silage " "	24.0	22.0	18.5	18.2	8.8	1.3	3.1	6.0	7.4	14.7	23.3	24.2
Pasture (days)	—	—	—	—	.59	.88	.96	1.12	1.05	.73	—	—

Monthly Costs and Returns - Table 15 shows the average monthly production per cow, and the feed and labor requirements, based upon these 74 herds in 1933. If one assumes that the charges other than feed and labor, such as cow depreciation and interest, bull expense, D. H. I. A. expense, shelter and equipment use and the like, can be spread equally over the 12 months, then one can figure milk and cream costs for any month under various price conditions, using the data in Table 15. If the herd is of average efficiency, then the labor and feed requirements per pound butterfat should be multiplied by prices at that time. This cost will be the feed and labor cost per pound butterfat, and this is two-thirds the total cost. If the cost per 100 pounds of milk is desired, multiply the total cost per pound butterfat by the average test of the milk.

Figure 3 shows the monthly feed and labor cost per cow, and the value of the products produced. Costs other than feed and labor averaged \$2.83 monthly. This amount plus feed and labor shows that there was about ten dollars profit from May thru October, but there was about three dollars loss in the other six months. June and July were the high profit months. Dairying, however, is a 12 months' business, and cannot be drastically increased or reduced to conform to the most profitable months.

Figure 3 - Monthly Feed and Labor Cost, and Value of Products per Cow - 1933



Comparison of 1932 and 1933 Costs and Returns - This dairy study was started in 1932 so data on complete costs is available for these two years. Table 16 shows all the more important items of cost and income for the herds on which cost records were kept. While the number of cost records the two years were nearly the same the geographic distribution through-out the State was different. In 1933 there were some records from the Upper Peninsula and a few from northern Michigan, which areas were not represented in 1932, and there were fewer records in the south-eastern part of the State. This fact, no doubt had an influence on the amounts of the various kinds of feed that were fed per cow during the year.

The average butterfat production per cow was the same both years. There appears to have been a tendency to feed less grain and more hay in 1933, especially in the west-central area. The hours labor per cow for the year was practically the same. The depreciation in the cow value was much lower in 1933, due largely to price trends in cow values, and not to culling rate or disease losses. This cost item changed more than any other in the two years, and caused a reduction in the total cost even though feed prices in 1933 averaged about 20 per cent higher than in 1932. Feed prices at the present time (June 30, 1934) are approximately 25 per cent higher than the 1933 average. Dairy product sales averaged about 10 per cent higher in 1933 than 1932. These changes in costs and returns resulted in a return of \$7.11 a cow for management in 1933 compared to a negative return of \$12.36 in 1932. Comparison of items of cost and return can best be made on the "per lb. B.F." basis in Table 16, rather than on the milk basis because of difference in the average butterfat test.

Table 16 - Dairy Costs and Returns in Michigan for 1932 and 1933

Items	Per Cow		Per Cwt. Milk		Per Lb. B. F.	
	1932	1933	1932	1933	1932	1933
Number of records	64	74				
Number of cows in herd	11.4	11.9				
B.F. production per cow	333	333				
Milk " " " "	8,128	7,457				
Av. butterfat test (%)	4.10	4.47				
Feeds used: Concentrates (lbs.)	2,320	2,031	28.5	27.2	7.2	6.1
Hay " " " "	2,857	3,317	33.4	44.4	8.5	10.0
Silage " " " "	5,152	4,660	62.7	62.3	15.9	14.0
Other roughage " "	639	216	7.8	2.8	1.8	.6
Pasture days	175	151	1.9	2.0	.5	.5
Man hours	154	153	1.9	2.0	.5	.5
CHARGES:						
Feed	\$ 45.11	\$ 48.01	\$ 0.53	\$ 0.64	13.6¢	14.2¢
Man labor	23.04	22.92	.25	.31	6.9	6.8
Use of bldgs. and equipment	10.06	9.79	.12	.13	3.0	2.9
Depreciation	18.48	5.81	.24	.08	5.6	1.7
All other charges	22.82	18.35	.27	.24	6.9	5.8
Total	\$119.51	\$104.88	\$ 1.41	\$ 1.40	36.0¢	31.4¢
CREDITS:						
Milk, cream or butter	\$ 87.37	\$ 96.60	\$ 1.08	\$ 1.29	26.3¢	29.1¢
All other credits	19.78	15.39	.21	.21	5.9	4.5
Total	\$107.15	\$111.99	\$ 1.29	\$ 1.50	32.2¢	33.6¢
PROFIT OR LOSS	\$-12.36	\$ 7.11	\$ -.12	\$.10	-3.8¢	2.2¢
Labor return	\$ 10.68	\$ 30.03				
" " per hour	8¢	20¢				

SUMMARY OF DAIRY COSTS AND RETURNS

1. Influence of location - The cooperators in the Upper Peninsula and northern Michigan had higher feed prices, higher buildings and labor charge. Prices for butterfat were lowest in the Upper Peninsula and highest in the south-central area.

2. Annual costs and returns per cow - Annual costs were \$104.88. These 880 cows had an average production of 333 pounds of butterfat. The value of the dairy products, the manure, and the calf totaled \$111.99 per cow for the year.

3. Costs and returns per pound butterfat - Total cost per pound of butterfat under 1933 conditions, for these 74 better than average dairymen was 31.4 cents. The income from the sale of milk, cream or butter averaged 29.1 cents per pound of butterfat, and credit for calves and manure made a total credit of 33.6 cents.

4. Importance of different items of cost - In 1933 feed constituted 45.8 per cent of the total cost, man labor 21.9, shelter and equipment 9.3, cow depreciation 5.5, interest on cow value 3.6, D. H. I. A. expense 3.2, bull expense 3.1, and all other items 7.6 per cent.

5. Influence of product sold on costs and returns - Costs of producing a pound of butterfat on farms selling milk or cream differed but little in 1933, except as feed prices varied due to location. Income per pound butterfat produced was 20 per cent lower on farms selling cream than on those selling milk.

6. Influence of production per cow on costs and returns - The nine highest producing herds averaged 441 pounds of butterfat per cow and the nine lowest 210 pounds. Return for management (profit) was \$26.80 per cow in the first case and negative \$5.62 per cow on the low-producing herds. Cost per pound butterfat was 26.8 and 39.8 cents, respectively.

7. Feed cost per pound butterfat - The average feed cost per pound butterfat was 14.2 cents, but 15 low-cost men had an average feed cost of 10.9 cents and the 15 high-cost men 18.4 cents a pound. Nearly one-half of this difference appears to be the result of better feeding practices such as use of legume pasture, feeding grain on pasture and better balanced rations, and over one-half to the price of the feed, which was affected by location and character of the ration.

8. Size of herd as related to production and costs - Small herds had slightly higher production per cow than average, but higher labor and buildings cost per cow. Total cost per pound butterfat was nearly the same for all size herds.

9. Milking machine costs and labor saved - Annual cost of operating milking machines on 15 farms with herds of 17.6 cows averaged \$45.95, or \$2.60 per cow. In herds averaging 20 cows the use of a milker saved 27 hours of labor per cow in the year on the average and added \$2.65 to the equipment cost.

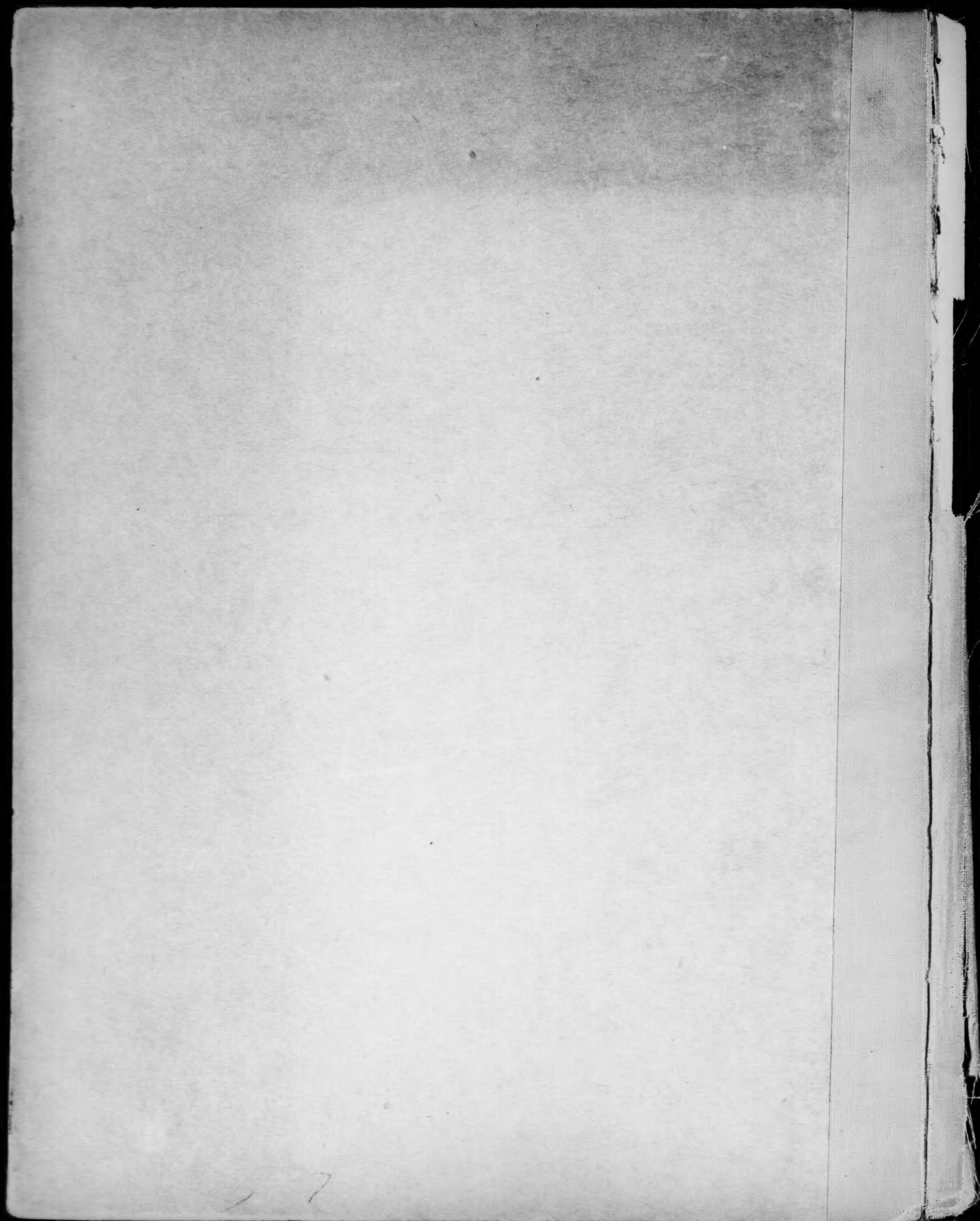
10. Relation of breeding of herd to costs and returns - Herds having a high percentage of purebred cows had higher cow depreciation, higher bull expense, and higher total cow cost annually than grade herds. On the other hand, these herds produced more butterfat per cow, and the calves were worth more.

11. Annual bull costs - Total cost on 56 bulls averaged \$61.98 for the year. Manure and other credits reduce this total to a net cost of \$45.65 or \$3.65 a cow.

12. Accumulative effect of efficient methods - Five herds were better than average in five of six measures of efficiency. Twelve herds were better than average in not over one factor. Butterfat cost 24.4 cents a pound in the first group, and 39.2 cents in the later. Net return per cow for the year was \$20.00 and negative \$11.21, respectively.

13. Monthly costs and returns - These 74 herds made an average profit of over ten dollars per cow from May through October, but lost three dollars a cow in the other six months.

14. Comparison of costs and returns for 1932 and 1933 - Butterfat produced on cost-record farms cost 36.0 cents in 1932 and 31.4 cents in 1933. Depreciation in cow values caused the high cost in 1932. Rising feed prices increased the cost in 1933. Total credits for all products averaged 32.2 cents per pound butterfat in 1932 and 33.6 in 1933. Return per hour labor was 8 cents and 20 cents, respectively.



**END OF
TITLE**